(c) is obtainable from said cell or organism in correctly folded form, without a need for denaturation and renaturation and mimics said epitope or epitopes in their native form; and

(d) is capable of inducing an immune response in a mammal, including said subject, without a need for adjuvant or other immunostimulatory materials, so that administration of said polypeptide results in an antibody or cell-mediated immune response to said epitope or epitopes.

55. The polynucleotide of claim 54 wherein said polypeptide is produced in a plant.

56. The polynucleotide of claim 55 wherein said polypeptide is produced transiently in said transformed or transfected plant.

57. The polynucleotide of claim 54 wherein said polypeptide comprises at least two peptide domains.

58. The polynucleotide of claim 54 wherein said tumor is a B-cell lymphoma and said tumor epitope is a surface immunoglobulin epitope.

59. The polynucleotide of claim 58 wherein said polypeptide comprises at least one idiotypic epitope of the V region of said immunoglobulin.

60. The polynucleotide of claim 59, said polypeptide further comprising two V region domains of said immunoglobulin.

61. The polynucleotide of claim 60 wherein said two domains of said polypeptide are at least part of the V_H and at least part of the V_L domains of said immunoglobulin.

62. The polynucleotide of claim 61 wherein said part of the V_H region of said polypeptide includes at least one complementarity-determining region (CDR).

63. The polynucleotide of claim 62 wherein said CDR of said polypeptide is CDR2.

64. The polynucleotide of claim 61 wherein said polypeptide is a two-domain single chain antibody (scFv) that includes said at least part of the V_H and the V_L domains.

65. The polynucleotide of claim 64 wherein said polypeptide comprises V_H and the V_L domains.

66. The polynucleotide of claim 64 wherein said domains of said polypeptides are linked by an amino acid linker that

(a) has between one and about 50 residues;

(b) consists of between one and 12 different amino acids, and

(c) facilitates secretion and correct folding of said polypeptide to mimic the tumor epitope in its native form in or on said tumor cell.

67. The polynucleotide of claim 66 wherein the linker of said polypeptide is a member of a randomized library of linkers that vary in size and sequence, and said library is encoded by nucleic acid sequences consisting of a repeated pattern of degenerate repeated triplet nucleotides having the following requirements;

(i) position 1 of each repeated triplet cannot be the same nucleotide as position 2 of the repeated triplet;

(ii) position 2 of each repeated triplet cannot be the same nucleotide as position 3 of the repeated triplet; or

(iii) position 1 of each repeated triplet cannot be the same nucleotide as position 3 of the repeated triplet.

68. The polynucleotide of claim 67, wherein in said linker of said polypeptide, the nucleotide in the first and second positions of each repeated triplet is selected from any two of deoxyadenosine, deoxyguanosine, deoxycytidine or deoxythymidine.

69. The polynucleotide of claim 66, wherein in said linker of said polypeptide,

(i) position 1 of each repeated triplet is deoxyadenosine or deoxyguanosine;

(ii) position 2 of each repeated triplet is deoxycytidine or deoxyguanosine; and

(iii) position 3 of each repeated triplet is deoxythymidine.

70. The polynucleotide of claim 54 wherein said polypeptide is in solution.

71. The polynucleotide of claim 54 wherein said polypeptide is adsorbed to, bound to, or integrated into a carrier or delivery system.

72. The polynucleotide of claim 54 wherein said immune response is a protective anti-tumor immune response.

73. The polynucleotide of claim 54 wherein on administration to a mammalian host, including said subject, said polypeptide induces a polyclonal anti-idiotypic antibody response or a cell mediated immune response.

74. The polynucleotide of claim 73 wherein the host is a human and said polyclonal anti-idiotypic responses are detected by testing serum or peripheral blood cells of the host.

75. The polynucleotide of claim 73 wherein the antibody response is measured in an enzyme immunoassay or by flow cytometry.

76. The polynucleotide of claim 73, wherein said administration comprises subcutaneous immunization with at least about 15 μg of said polypeptide antigen three times, each about two weeks apart.--

REMARKS

The above claims parallel claims 1 – 23 as filed, the new claims being directed to the encoding polynucleotides.